

REMARKS

Response to §112 Rejections of Claims 1-4

In the February 9, 2006 Office Action, the Examiner rejected claims 1-4 of the present application under 35 U.S.C. §112, first paragraph, as alleged failing to comply with the written description requirement.

In response, Applicants have hereby amended claims 1 (from which claims 2-4 depend) and 3, as follows:

First, Applicants have amended claim 1 to positively recite “a trench top oxide (TTO) layer located completely inside the deep trench for by U.S. Patent No. 6,437,381 issued to Gruening et al. (hereinafter “Gruening”). Specifically, the Examiner asserted that the gate oxide layer 160 disclosed by Gruening in Figure 15 constitutes a “trench top oxide (TTO) layer” recited by claims 1-4 of the present invention.

Applicants respectfully disagree.

Specifically, Applicants have hereby amended claim 1, from which claims 2-4 depend, to recite a trench top oxide (TTO) layer that is “located completely inside the deep trench” for isolating the deep trench conductor and said buried-strap out diffusion region from a gate conductor region.” Support for such a TTO layer, as recited by the amended claim 1, can be found in Figures 2F-2H of the instant specification, which show at least one TTO layer 28 that is located *completely* inside a deep trench.

Therefore, the TTO layer as recited by the amended claim 1 is supported by the instant specification as originally filed, consistent with the written description requirement of 35 U.S.C. §112, first paragraph.

The amended claim 1 still patentably distinguishes over the previously cited reference, i.e., U.S. Patent No. 6,437,381 to Gruening et al. (hereinafter "Gruening"), because Gruening only discloses a gate oxide layer 160 that extends outside of the trench 200 and is not completely located inside the trench 200 (see Gruening, Figure 15).

Second, Applicants have hereby amended claim 3 to recite that each said vertical MOSFET includes "a gate dielectric formed on an inner surface of a sidewall of each said deep trench." Support for such a gate dielectric can be found in Figures 2E-2H of the instant specification, which show a gate dielectric 70 formed on an inner surface of a sidewall of each deep trench.

Therefore, the gate dielectric as recited by the amended claim 3 is supported by the instant specification as originally filed, consistent with the written description requirement of 35 U.S.C. §112, first paragraph.

In the February 9, 2006 Office Action, the Examiner also rejected claims 1-4 under 35 U.S.C. §112, second paragraph, for indefiniteness. Specifically, the Examiner asserted that the recitation by claim 1 of a collar oxide region that is formed "on a remaining wall portion of each deep trench not containing said buried-strap out diffusion region" is vague and indefinite, pointing to the fact that Figures 2G and 2H of the instant specification show collar oxide 18 formed only on the right side and the lower left side of the deep trench that do not contain the buried-strap out diffusion region, while an upper left side portion of the sidewall of the deep trench adjacent the gate oxide also does not contain the buried-strap out diffusion region, but the collar oxide 18 is not formed on this upper left side portion.

In response, Applicants have amended claim 1 to recite "a collar oxide region formed on one or more remaining portions of each deep trench not containing said buried-strap out diffusion region." Claim 1 as amended clearly and unequivocally delineates the location of the collar oxide region as being on one or more remaining portions, but not necessarily the entire remaining portion, of the deep trench not containing the buried-strap out diffusion.

Correspondingly, the collar oxide region as recited by claim 1 does not have to be formed on the upper left side portion of the sidewall of the deep trench adjacent the gate oxide, although this

upper left side portion also constitutes one of the remaining portions of the deep trench that does not contain the buried-strap out diffusion region.

Therefore, the claim 1 as amended herein is clear and definite and complies with the requirements of 35 U.S.C. §112, second paragraph.

Based on the foregoing, Applicants respectfully request the Examiner to reconsider, and upon reconsideration to withdraw, the §112 rejections of claims 1-4.

CONCLUSION

Based on the foregoing, claims 1-4 as amended herein are in condition for allowance. Issue of a Notice of Allowance for the application is therefore requested.

If any issues remain outstanding, incident to the formal allowance of the application, the Examiner is requested to contact the undersigned attorney at (516) 742-4343 to discuss same, in order that this application may be allowed and passed to issue at an early date.

Respectfully submitted,



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Enclosures